ADAPTATION OF SCHELLING'S DIMENSIONAL SEGREGATION MODEL FOR FORECASTING AND SIMULATION OF EMPLOYEE BEHAVIOR IN POINT OF RETAINING PROFESSIONALS FOR BENEFITS OF EMPLOYING COMPANY

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Internal labor market monitoring is the key concept in enterprise management. Carrying qualified employee surveillance allows to take timely measures on effective human resources by making recruitment policy decisions in proper time.

Schelling's segregation model is one of widely distributed models in sociology. Schelling's dimensional segregation model is a well-known sociological model using which Shelling tried to explain empirical phenomenon of population distribution by two types: racial type and income level type. In order to explain this phenomenon Shelling used agent-oriented model that was based on three components: “persons-agents”, “behavior-rules”, “persons + behavior = outcome” (outcome is something that happens if persons act by a rule) [1], [2].

Shelling depicted each person as a square on chess board and considered the whole city as gigantic chess board. Each square can be either filled or empty.

He introduced a threshold for each person. The threshold is a kind of measure achieving which individual makes a decision on his/her further actions. Behavior is determined by preferred number of similar persons.

Currently, NetLogo software environment can be used for Shelling’s model visualization; it presents us the aggregation within different parameters that have been set (Fig.1). NetLogo is a continuation of Logo language, apparently, which was the first language and by united efforts of the Massachusetts Institute of Technology and BBN Corporation (Bolt Beranek & Newman) was established in 1968 for the purposes of children education with a help of computer.

Number of persons, decision making threshold and other are considered as parameters. In percent ratio aggregation determines similar objects as well as objects that are different. For example, results for racial tolerance are impressive: with a threshold of 30% (that is persons require 30% of neighbors which are similar to them) we obtain 72% of persons living with neighbors similar to them.

If pursuing to Schelling's model enterprise is considered as a city and employee is considered as a making decisions agent, “neighbors” will be the factors of motivation determined by human resources specialist, phycologist or by invited business advisor for the given time interval.

This model is characterized by the value of critical point and genesis. For example, if tolerance level of employee-agent corresponds to 15 % (the percentage of motivation factors importance for the agent is a “categoricity” of the subject) with the

availability of 7 motivation factors, changes which result in impact on one of the factors will force the employee to make a decision on work change.

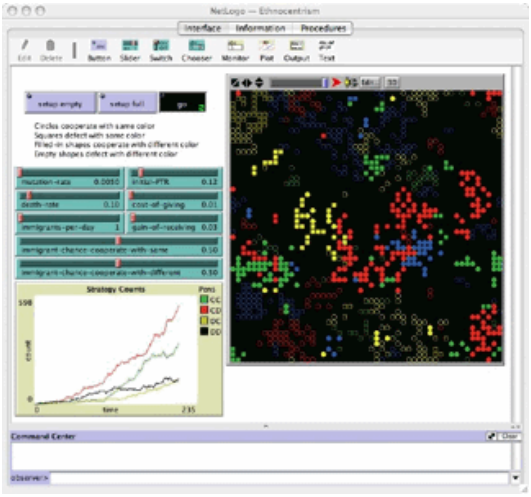

Fig. 1. Sample of Shelling segregation simulation in NetLogo

The higher number of employees with the low percentage of “critical point” the higher risk of employee group mass mobility outside of the enterprise. Genesis moment occurs when external factor appears that may become a reason for the agent to make a critical for company decision. Assuming that only one factor that is negative for the agent appears and when number of factors-“neighbors” is 7 and level of “tolerance” is equal to 15% the employee will again make a decision to continue to work on this enterprise.

Using Schelling's Models for municipal economy enterprises in real-life situations it is necessary to take into consideration the fact that motives of one person by no means determine general tendencies of the company; however, having several number of agents-employees similar by tolerance level migration trends of employee group can be forecasted.

Thereby, if transfer forecasting from person behavior based on his/her own beliefs to employee group evaluation program and additional data analysis, we receive a new approach of Schelling's model implementation.

1. Micromotives and Macrobehavior, W. W. Norton and Company, 1978.
2. Raymond McLeod, Jr. Management information systems. New York, Macmillan Publishing Company, 2000.